

REMARKS

The final Office Action dated June 10, 2003 has been carefully considered. Claims 1-3, 6, 7, and 11-16 were pending in the application, with claims 3, 7, and 11-14 withdrawn from consideration. Claims 1 and 2 (as well as withdrawn claims 3, 7, 11, and 12) have been amended. Claim 16 has been canceled. Therefore, claims 1, 2, 6, and 15 are pending for reconsideration at this time.

The Examiner is thanked for acknowledging receipt and entrance of the amendments presented in Applicants' April 17, 2003 response, Applicants' February 28, 2002 submission of a Substitute Specification, and Applicants' Preliminary Amendment filed October 17, 2001.

Objections

In the Office Action, claims 1, 2, 6, and 15 are objected to for being improper. Applicants sincerely thank the Examiner for the provided amendment suggestions. Accordingly, claim 1 has been amended to overcome the objection.

35 U.S.C. 112 Rejections

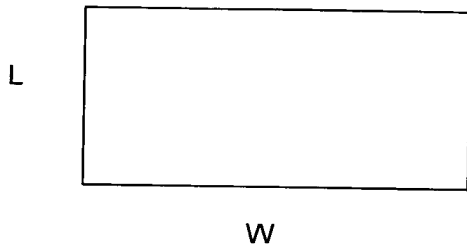
In the Office Action, claim 16 is rejected under both 35 U.S.C. § 112, first paragraph, and 35 U.S.C. § 112, second paragraph. Claim 16 has been canceled.

Prior Art Rejections

In the Office Action, claims 1, 2, and 16 were rejected under 35 U.S.C. § 102(b) as being anticipated by any one of U.S. Patent Nos. 5,677,938 to Gassman (hereinafter "Gassmann"), 3,929,565 to Fredin et al. (hereinafter "Fredin"), or 3,147,191 to Crowther (hereinafter "Crowther"). Claim 15 was rejected under 35 U.S.C. § 103(a) as being unpatentable over either one of Gassmann or Crowther in view of the combination of U.S. Patent Nos. 3,917,768 to Abate-Daga et al. (hereinafter "Abate-Daga") and 4,671,927 to Alsop (hereinafter "Alsop"). Claim 6 was rejected under 35 U.S.C. § 103(a) as being unpatentable over either one of the combination of Gassmann with Abate-Daga and Alsop or the combination of Crowther with Abate-Daga and Alsop, and further in view of U.S. Patent No. 5,524,033 to Hida et al. (hereinafter "Hida"). Applicants respectfully traverse these rejections for at least the following reasons.

Claim 1 recites that a ratio (B / S) of the width (B) of the control rod blades to a surface area (S) of a square having sides each being equal to the pitch between the fuel assemblies is set in a range of 0.06 to 0.08 cm^{-1} . None of the cited references teaches, suggests, or discloses this feature.

On page 5 of the Office Action, the PTO states that "this B/S ratio is a relationship between blade width and pitch of the fuel assemblies." Applicants strongly disagree. Rather, (B / S) is a ratio of the width (B) of each control rod blade to the surface area (S) of the square having sides equal to the pitch (A), and thus has the units " cm^{-1} ". The following example is shown for further clarification. A drawing of a rectangular plot of land has length L and width W .



If directly measured from this page, L is approximately 1 inch and W is approximately 2 inches. Of course, a drawing having such dimensions does not suggest or imply that the actual plot of land depicted by the drawing has dimensions of 1 inch by 2 inches. Clearly, the drawing is merely a representation. In the drawing, the ratio L / W may be approximated at 0.5, a unitless result. If the same rectangle were enlarged (e.g., to the size of the actual plot of land depicted by the drawing), the ratio L / W would remain precisely the same. Because the ratio L / W is insensitive to the absolute length of L or W , one may correctly deduce that the actual plot of land depicted by the drawing has the same L / W ratio of 0.5.

In sharp contrast, a ratio of length L to the surface area S of the rectangle (where $S = L * W$) may be written as $L / (L * W)$ or $1 / W$ and may be calculated (for the above example) as 0.5 inch^{-1} , a result having units of "per length (in inches)." If the same rectangle were then enlarged (e.g., to the size of the actual plot of land depicted by the drawing), the ratio L / S would change with width W . For example, if the rectangle were enlarged so that $L = 2$ inches and $W = 4$ inches, then, while the ratio L / W would remain constant at 0.5, the ratio L / S would change to 0.25 inch^{-1} . Thus, the ratio L / S depends on the actual (or absolute) width W . Without knowing the absolute width W , there is simply no means available to

determine the ratio L / S for the actual plot of land depicted by the drawing. Thus, if the drawing of an object is a scaled-down drawing of the object, then the ratio L / S measured from the drawing will be different than the ratio L / S of the actual object depicted.

Analogously, the drawings pointed out by the PTO (e.g., Fig. 3 in Gassman, Fig. 8 in Fredin, and Fig. 2 in Crowther) are obviously scaled-down drawings of the depicted fuel assemblies, and the drawings do not contain any absolute scaling information. For example, Applicants have directly measured (using a ruler) the pitch of the fuel assemblies shown in Fig. 2 of Crowther at approximately 0.31 inch. As well known in the art, fuel assemblies this small simply do not exist—thus, the drawing must be a scaled-down representation. Further, Crowther specifically discloses a more typical fuel assembly width (the width between opposite outside surfaces of the square flow channel) at 4.38 inches. (Col. 11, lines 70-71.) Therefore, while relative lengths of features in the drawings may be determined by direct measurement of the drawings, the ratio B / S (a ratio of a length to an area) can only be measured for the drawing itself, and this measured ratio does not apply to the actual features of the object depicted in the drawings.

For the reasons given above, Applicants respectfully submit that, even if direct measurement of the cited drawings may yield relative lengths, the ratio B / S simply cannot be measured from the drawings because the drawings are scaled-down representations.

Next, even if the ratio B / S could be measured directly from the drawings, which it can not, Applicants simply cannot arrive by direct measurement at a ratio B / S in the range of 0.06 to 0.08 cm^{-1} , in spite of earnest measurement attempts. Referring first to Fig. 3 of Gassmann, Applicants have directly measured (using a ruler) the pitch (A) between the drawn fuel assemblies at 6.0 cm and the width (B) of the drawn control blades at 4.6 cm, yielding a ratio $B / S = B / A^2$ of the drawing of 0.127 cm^{-1} , greater than the claimed range of 0.06 to 0.08 cm^{-1} . Next, referring to Fig. 8 of Fredin, Applicants have measured the pitch (A) between the drawn fuel assemblies at 5.2 cm and the width (B) of the drawn control blades at 2.4 cm, yielding a ratio $B / S = B / A^2$ of the drawing of 0.088 cm^{-1} , greater than the claimed range of 0.06 to 0.08 cm^{-1} . Next, referring to Fig. 2 of Crowther, Applicants have measured the pitch (A) between the drawn fuel assemblies at 0.8 cm and the width (B) of the drawn control blades at 0.5 cm, yielding a ratio $B / S = B / A^2$ of the drawing of 0.78 cm^{-1} , greater than the claimed range of 0.06 to 0.08 cm^{-1} . The PTO is respectfully requested to inform Applicants if the PTO arrived at substantially different values of these measurements;

if the PTO's measurements are not substantially different from those given above, the PTO is respectfully requested to explain how direct measurement of the drawings yields a ratio B / S of the width B of the control rod blades to the surface area S in the range of 0.06 to 0.08 cm^{-1} .

None of the Gassmann, Fredin, or Crowther references teaches, suggests, or discloses, whether in their specifications or by direct measurement of their drawings, that a ratio (B / S) of the width (B) of the control rod blades to a surface area (S) of a square having sides each being equal to the pitch between the fuel assemblies is set in a range of 0.06 to 0.08 cm^{-1} . None of Abate-Daga, Alsop, and Hida cures the deficiencies of Gassmann, Fredin, or Crowther. Thus, independent claim 1, and all claims dependent therefrom, are believed to be patentable over the cited references. Withdrawal of the rejections is respectfully requested.

Finality of the Office Action

According to the first Office Action on the merits (dated January 17, 2003), the rejection of independent claim 1 was based on the direct measurement of the cited drawings. In spite of arguments in Applicants' April 17, 2003 reply against such a rejection, the rejection of independent claim 1 was maintained on the same grounds in the final Office Action. As pointed out above, such a direct measurement cannot yield the ratio B / S as claimed in claim 1. Therefore, withdrawal of the finality of the Office Action and entrance of the present amendments is respectfully requested. In any event, merely because the above amendment cancels claim 16 and amends claim 1 as suggested by the Examiner, it is respectfully requested that these amendments be entered.

Conclusion

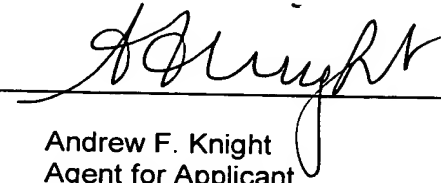
Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

Respectfully submitted,

Date 9/10/03

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